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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,614	04/22/2004	Paul L. Falkenstein	NC 96,039	7320

26384 7590 10/12/2006

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EXAMINER	
DEHGHAN, QUEENIE S	
ART UNIT	PAPER NUMBER
1731	

DATE MAILED: 10/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/829,614	FALKENSTEIN ET AL.	
	Examiner	Art Unit	
	Queenie Dehghan	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because it exceeds 150 words.

Correction is required. See MPEP§608.01(b).

3. The disclosure is objected to because of the following informalities: Claim 16 recites a graphite tube and the specification does not disclose a graphite tube.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 34 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which

was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The applicant discloses a non-glass material as graphite and the removal of the graphite rods via oxidation. The process step of etching is referred to etchable glass tubes. The specification fails to provide antecedent basis for a non-glass tube that is removed via etching.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 18, 20, 21, 23-26, 29, 31, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al (2004/0050110) in view of Siegmund (3,275,428).

9. Regarding claims 18 and 31, Berkey et al. disclose a method for making holey fiber comprising:

a. stacking a plurality of structures comprising a first structure of a first material (i.e. glass tubes) with a lower softening point and a second structure of a second material (i.e. graphite rods) with a higher softening points to form a bundle containing interstices between the structures ([0008], [0047], [0034]),

b. creating a fused element by heating the bundle to a fusion temperature to soften the first structure such that the first structure flows around a portion of the second structure and closes the interstices between the tubes, and such that the second structure retains shape ([0047]),

c. creating a preform having channels therein by removing the second structures from the fused element ([0047]),

d. and drawing the preform to form the holey fiber ([0056]).

However, Berkey et al. fail to disclose a second material having a hollow central portion. Siegmund teaches a method of stacking structures comprising of two different materials with different softening points (col. 1 lines 27-36, col. 3 lines 30-43), wherein the higher softening point material is etched away after fusing (col. 3 lines 12-16). Furthermore, Siegmund teach of prior art where the bundles used sold core parts inefficiently removed by etching due to the exposure of the etchable surfaces and teaches to use etchable tubes instead (col. 1 lines 27-41, 62-71). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the tubular shape of the removable second structure of Siegmund in the process of Berkey et al. in order to

provide a large surface/opening that can effected to expedite the removal of the etchable material, as taught by Siegmund.

10. Regarding claim 20, Berkey et al. disclose the step of applying a vacuum to the bundle to remove air ([0047]).

11. Regarding claims 21 and 24, Berkey et al. disclose stacking a glass tubes and rod of a first material and rod of a second material. However, the second material of Berkey et al. is graphite and not glass, nor is it a rod. As mentioned above, Siegmund teach using etchable glass tubes as the second material structure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the glass tubes of Siegmund in the process of Berkey et al. in order to provide a large surface/opening that can effected to expedite the removal of the etchable material, as taught by Siegmund.

12. Regarding claim 23, Berkey et al. disclose holey fiber made from stacking structures comprising silica glass and fluorine glass ([0051]).

13. Regarding claim 25, Berkey et al. fail to disclose removing the second structure by etching. Siegmund teaches removing the glass tubes by etching with an aqueous acidic solution (col. 5 lines 40-51). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the aqueous acidic solution of Siegmund in the process of Berkey et al. in order to remove the glass tubes of second material efficiently and remain the desired channels.

14. Regarding claim 26, Berkey et al. disclose using graphite rods as the higher softening point structure that is removed via heating in an oxidizing environment ([0034], [0074]).

15. Regarding claim 29, Berkey et al. disclose providing a clad tube of first softening point material ([0049]). Siegmund also teach placing the bundle in a glass tube form of the same first material with the same low softening point, and spaces between the tube and structures are filled during fusing (col. 4 line 70 to col. 5 line 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the clad tube with the same low softening point of Siegmund in the process of Berkey et al. in order form a homogenous clad layer.

16. Regarding claim 34, Berkey et al. disclose the use of several non-glass material as sacrificial structure to be removed, such as ceramics and polymeric materials ([0034]) and also disclose the removal of the sacrificial structure via physical or chemical methods ([0038]), such as etching ([0033]).

17. Claims 21-22, 24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al (2004/0050110) in view of Siegmund (3,275,428), as applied to claim 18 above and in further view of Fekety et al. (6,917,741) and Sanghera et al. (US 2005/0025965).

18. Regarding claims 21-22 and 24, Fekety et al. disclose stacking first structures comprising glass tubes of a first material with a lower softening point material and second structures comprising glass tubes of a second material with a higher softening point (col. 2 lines 19-34, col. 7 line 56 to col. 8 line 6). Fekety et al. further provide an

example where the structures of the lower softening point material are the glass filler rods and the structures of the higher softening point material are glass tubes (fig. 14, col.10 lines 10-18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the glass tubes of second material of Fekety et al. in the process of Berkey et al. and Siegmund in order maintain the desired channels in the preform. Furthermore, Fekety et al. disclose an example where a glass tube of 1.5mm outer diameter and 1.3mm inside diameter where used, but do not disclose the diameter of the filler rods used (col. 10 lines 17-18). Sanghera et al. teach an example of stacking glass tubes and rods to form a holey fiber preform, where rods used had an outside diameter of 0.9mm ([0033], [0034]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the rods of Sanghera et al. in the stacked structure of Berkey et al, Siegmund and Fekety et al. order to provide mechanical integrity to the stacked structure, as suggested by Sanghera et al.

19. Regarding claim 27, Berkey et al. and Siegmund fail to disclose stacking a second material in a central region of the bundle to form a holey fiber with a hollow core. Fekety et al. teach placing a second material of higher softening point in a central region of the bundle (col. 7 line 56 to col. 8 line 6). Fekety et al. also teach the desire to stack easily etchable glass tubes in the central region of the bundle (col. 6 lines 25-28) in order to form a holey fiber with a hollow core (col. 4 lines 6-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize method step of stacking structures of second material in the central region of a bundle

in the process of Berkey et al. and Siegmund in order to form a holey fiber with a core void for localizing light in a PBG fiber, as taught by Fekety et al.

20. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al (2004/0050110) in view of Siegmund (3,275,428), as applied to claim 18 above, and in further view of Fekety et al. (6,917,741) and Large et al. (US 2005/0147366). Berkey et al. disclose the use of vacuum, as mention above, and both Berkey et al. and Siegmund disclose the use of a clad tube. Fekety et al. also disclose a step of applying a partial vacuum to the bundle to remove air therefrom (col. 5 lines 11-15) and the insertion of the preform into a clad tube (col. 5 lines 23-24). However, Berkey et al., Siegmund and Fekety et al. do not disclose inserting a holey fiber into a clad tube and drawing the complex structure. Large et al. suggest the suggest the subsequent steps of inserting holey fiber into a clad tube and drawing the structure to form a holey fiber of reduced cross section ([0074]). It would have been obvious to one ordinary skill in the art at the time the invention was made to utilize the further cladding and drawing steps of Large et al. in the method of Berkey et al., Siegmund and Fekety et al. in order to control the size of the final fiber.

21. Claims 19, 30 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al (2004/0050110) in view of Siegmund (3,275,428), as applied to claims 18 and 31 above, and in further view of Fajardo et al. (6,847,771). Berkey et al. and Siegmund fail to disclose the fusion and drawing temperatures of the holey fiber preform. Fajardo et al. teach utilizing appropriate fusion and drawing temperatures that allow for lower softening point material to fuse without distorting the shaped holes of the

higher softening point material (col. 8 lines 41 to col. 9 lines 43, col. 11 lines 1-17). It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the fusing and drawing temperatures of the preform, as suggest by Fajardo et al. in the method steps of Fekety et al., Large et al, and Chesnoy et al. or Berkey et al. in order to prevent distortion of the holes in the preform and fiber.

22. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al. (US 2004/0050110) in view of Siegmund (3,275,428), as applied to claim 31 above, in further view of Sato et al. (7,026,025) and Fekety et al. (6,917,741). Berkey et al. and Siegmund fail to disclose the diameters of the structures used in the holey fiber preform. Sato et al. teach using glass rods with an outer diameter of 1mm (col. 6 lines 30-31). Also, Fekety et al. teach of using rods and tubes, where the tubes have an inner diameter of 1.3mm and outside diameter of 1.5mm (col. 10 lines 17-18). Since Berkey et al. disclose the use of graphite rods in the fabrication of a holey fiber preform, and Fekety et al. teach using rods and tubes interchangeable and together, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize graphite tubes with the dimensions suggest by Fekety and the rods Sato et al. with an outer diameter of 1mm in the method for forming holey fiber of Berkey et al. in order achieve a holey fiber of a desired value.

Response to Arguments

23. Applicant's arguments with respect to the prior art of Berkey et al., Fekety et al, Large et al, and Chesnoy et al. have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP§706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Queenie Dehghan whose telephone number is (571)272-8209. The examiner can normally be reached on Monday through Friday 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Q Dehghan

ERIC HUG
PRIMARY EXAMINER